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ABSTRACT

The Computer Access Project offers specialized vocational training to individuals with severe physical disabilities. Ten participants, who were once thought unemployable, were given training in two areas of software applications (computer-aided drafting and bookkeeping). Student selection is described, and the importance of motivation noted. Individualized adaptations of the hardware and software for each student are reviewed, including headsticks, keyguards, and communication devices. Information on the 10 students is summarized. The paper suggests different courses of action and briefly describes the next phase, in which practical work experience is emphasized. (CL)

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# The Computer Access Project: A Program Model For Vocational Training and Placement For Individuals With Moderate To Severe Cerebral Palsy

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Abstract

The Computer Access Project is a specialized vocational training program implemented in September, 1985, by United Cerebral Palsy (UCP) of Alameda-Contra Costa Counties in Oakland, California. This paper describes the design and implementation of this model of vocational training. The model utilizes advances in rehabilitation engineering and computer technology to enable individuals, who were thought to be unemployable, to acquire competitive job skills. Ten individuals completed an eight month classroom curriculum: five individuals learned computer aided drafting and five learned bookkeeping using the personal computer. This project is the first one of its kind to focus specifically on the competitive employment of individuals with severe physical disabilities.

## Why This Project?

### Why UCP's Involvement?

United Cerebral Palsy of Alameda-Contra Costa Counties conducted a needs survey among over 1,000 individuals with cerebral palsy: the Number One need was for employment training and job placement. Perhaps the major reason why this particular UCP affiliate started the employment training program is its geographic proximity to Berkeley, California where a large number of people with severe disabilities have settled because of Berkeley's architectural accessibility and its relative abundance of services to this population.

UCP's average client has been unemployed for 10 years. The two major factors which have contributed to their seeming unemployability are: 1) the severity and complexity of their disabilities and 2) their lack of job skills and job related skills, which is the result

of little or no appropriate training. All of our clients have been closed cases of the State Department of Rehabilitation as "unable to rehabilitate."

This author has had a good deal of exposure to other programs for individuals with cerebral palsy throughout the United States because she was employed by the national organization of UCPA for several years. The problem of the seeming unemployability of individuals of at least average intelligence with severe physical limitations is not limited to the San Francisco Bay Area, where perhaps it is more pressing because of the large population of individuals who are both disabled and unemployed. Every affiliate of UCP sees this as a major problem with no real solutions available to them although everyone is aware of the microcomputer revolution and how this revolution can assist people with disabilities: Computers have assisted in the areas of communication and special education. Employment training still seems to be an area that has been explored very little for very good reasons: Computer equipment and engineering adaptations are very expensive; the rehabilitation engineering expertise isn't always available; training classes are long for this population and rich in staff/student ratio, which is also expensive. The California Department of Rehabilitation is very much oriented towards funding short-term (3 to 6 months) and inexpensive training programs ($1,000 per training).

## The Program Model

A formal market survey was not done to determine what training classes to offer. Staff interviewed several professionals in rehabilitation and high technology.* From information that was gathered,

it was decided to provide a training course in two areas of software applications. These two areas were chosen for three reasons: 1) speed is not a major factor in performing work tasks, 2) there is a growing job market for both jobs, 3) these jobs are white collar but not professional jobs so that college degrees are not a requirement. Therefore, this expands the client population which can be accepted into the training program. There were several practical considerations and restrictions which determined the design of the training course. Two of the major determining factors were the limited number of computers available and limitations in classroom space.

UCP received $67,500 from the State Department of Development Services Program Development Fund to implement the employment training program called the Computer Access Project. The target population was intelligent, moderately to severely disabled individuals with cerebral palsy. The program began in September, 1985, with the hiring of a project coordinator whose first task was to procure computer hardware and software since no funds had been allocated for this in the PDF grant. The coordinator accomplished this task very effectively. She was able to get up-to-date equipment donated directly from the manufacturers. Six IBM compatible machines were donated plus all necessary software. Six machines limited the class size to six students. Funds were unavailable to rent more space so

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Note. The local Administration for the Department of Rehabilitation. The President of a small software design company that uses CAD. Several CPA's working for both large and small accounting firms. Computer Aided Design and Bookkeeping using the personal computer.

the UCP conference room and two small adjoining offices (338 square feet) were converted into a classroom which could accommodate six wheelchairs.

We spent a great deal of time making the machines work with the software and adaptive peripherals. The project owns only two IBM machines. The other four are compatibles which we discovered were not as compatible as they could have been. For example, an Apricot Computer was donated that has a 3 1/2" disk drive. It runs the CAD software but materials can't be transferred to the other machines which have 5 1/4" disk drives. We also bought and returned two IBM "clones" because we were unable to use a piece of software called Keylock with them. This software is necessary to increase date entry speed. If we had the choice we could obtain only IBM machines.

Because of the number of computers available to us, the curriculum model was designed as two classes of three hours each meeting, 5 days a week. The CAD class met in the mornings and the bookkeeping class met in the afternoons. The PDF grant primarily funded staff positions. We were very fortunate to hire an architect who had experience in teaching CAD to teach our CAD class. The staff also consisted of a classroom aide who was a drafting student. The bookkeeping class was taught by a bookkeeper who has had experience in working with people who have severe disabilities and the bookkeeping aide who was a computer science student who helped up when there were software problems.

The teachers designed their own curriculum which was somewhat modified to accommodate the anticipated slowness of the students. It turned out that the bookkeeping class had to be slowed down even more, primarily because of the severe physical disabilities of the students.

The CAD curriculum was accelerated because the teacher discovered that because the students were "computer literate" they learned the material more quickly than her non-disabled students who were architects and draftspersons and tended to be more "computer-phobic" than the disabled students.

The classroom training began in January, 1986, and was scheduled to end in August. It was expected that 11 students need at least a B grade to graduate from the course. One person dropped out due to lack of interest and one person will not pass. All other students will graduate with a B grade or better.

## Assessment of Trainees

The project was very successful in selecting trainees who would be able to complete the training course. The application process consisted of two personal interviews; the submission of a short written essay explaining why the individual was interested in entering the program; the completion of aptitude tests to determine which training class would be most appropriate for the individual student; the submission of two written application forms giving personal and work history and a recent I.Q. score. The aptitude test for the drafting course was called The revised Minnesota Paper From Board Test. The bookkeeping test was procured from a temporary employment agency which administered this test to potential temporary employees. Both tests seemed to give an accurate indication of the trainees' potential to perform the work. We did have one student who received a very low score on the drafting test and turned out to be the best student in the class. Motivation played a large role in his classroom success.

One of the major criteria that the staff looked for in accepting students was their motivation. All students exhibited very high motivation to work hard in the classroom in order t gain skills so they could be employed. Another important factor in their success in the classroom was their excellent social skills. Individuals were not accepted if they exhibited socially inappropriate behavior. The basic students profile is a highly motivated socially skilled intelligent person who has some background in working with personal computers. No one in this initial class was totally "computer illiterate." We admit to "creaming" the selection of this class because the project needed a high rate in order to convince funding sources to provide on-going funding.

## Adaptations of Hardware and Software

Listed below are adaptations made for each of the students who needed them. Many of the adaptations were recommended and designed by the Rehabilitation Engineering Center at the Children's Hospital at Stanford. Approximately $7,000 of the PDF grant was designated for rehabilitation engineering design and consultation. An initial work-site evaluation was done for each student. An engineer and an occupational therapist came to the classroom and assessed the students' speed in accessing the computer keyboard and their seating and positioning as it related to their speed and accuracy on the keyboard. Work stations were designed for each individual according to the recommendations of the Rehabilitation Engineering professionals. Many of the other adaptations were done by volunteers so the project did not utilize all the funds allocated for engineering consultation.

Tom: Tom uses a headstick to access a membrane key communication device called AutoCom. A K-11 interface manufactured by Prentke-Romich was used with a special cable to hook the AutoCom keyboard to the IBM PC so that Tom could make full use of the computer. The adaptation made for Tom was the most technically difficult because it involved reprogramming his electronic communication device so it could perform all the functions of an IBM keyboard. Tom also uses software called Superkey to develop macros to minimize the number of keystrokes entered for use with the bookkeeping software.

Maria: Maria uses a simple keyguard manufactured by Prentke-Romich. She has a special Stanford Seat Insert which has helped her posture so that she tires much less easily an is able to work more quickly. Maria has athetoid cerebral palsy and her excess movement was causing her to kick the electronic plug out of its socket, thus disconnecting her computer. A plate was designed to fit over the socket, which solved the problem. Maria also uses the Superkey software.

Adele: She also uses the Superkey, which is a piece of commercially available software which was recommended by the engineer from Children's Hospital at Stanford. Adele used an Epson Speech Pac as a communication device. She was very unhappy with the quality of the voice and therefore rarely used the device, which had been purchased for her at great expense by the Department of Rehabilitation well before she entered the Computer Access Project. A DecTalk speech synthesizer was purchased for the project through a grant from the Digital Equipment Corporation and the Pacific Telesis Foundation.

This is a commercially available product which has excellent-quality voice output. It allows Adele to use a clearly understood female voice to communicate. The staff is working with volunteers to attach the DecTalk to Adele's wheelchair so that she can utilize it outside the classroom. The Toshiba T-1100 computer interfaces with the DecTalk and allows for storage of almost unlimited vocabulary and conversations. A volunteer from the U.S. Air Force who is stationed at the Lawrence Livermore Lab is in the process of writing a software program for the Toshiba to interface with the DecTalk. Phrases are being stored so that with one keystroke Adele can speak a whole phrase.

Tim: He uses the Keyport 300 initially. It is similar to a Koala Pad: It has a membrane surface. Tim was able to program it to perform several functions with the use of one keystroke. Tim has learned AutoLISP which is the programming language of the CAD software being used. He now designs macros directly on the keyboard and no longer needs the Keyport.

Description of the Commercially Available

Software Used in the Classroom

The AutoCAD software allows people who have never been able to draw to make accurate drawings. It allows individual users to customize the program to meet individual needs. AutoCAD is the most widely used CAD program among architects, engineers and manufacturers.

Easy Business Systems Plus is an accounting software package designed by Computer Associates. Its modules include general ledger, accounts payable and receivable, time billing and a "windowing" program which allows quick transferring of information to other modules.

Students also use two other pieces of software: Sidekick and MindReader. Sidekick can be used for note taking and arithmetic. The MindReader is a word processing program which allows the user to type whole phrases with just one keystroke.

The student in the bookkeeping class use Accutype, an electronic copyholder which allows them to scroll their work sheets using a foot or hand peddle.

## The Business Advisory Committee

The second major task of the Project Coordinator after she began her work with the CAP was to organize a Business Advisory Committee which would have a commitment to help establish the Computer Access Project. The BAC has assisted with hardware and software donations and provided many hours of free technical assistance. The BAC members primarily work in the high technology industry. Without their assistance the project would not have been able to get the computer equipment that was needed. Presently the BAC is helping plan a strategy to start two small sub-contract businesses. A business plan is being written with their help.

## Client Profiles

The Project started by accepting 12 students into the program. Unfortunately one student died before the program began and another dropped out halfway through the course, leaving us with 10 students. It was decided not to accept other people from the waiting list because the smaller the size of the initial class, the better we could teach the material on an individualized basis. Of the ten students in the two classes, six are electric wheelchair users and two are ambulatory with the use of cane and crutches. Three trainees are

non-oral. All but two have varying degrees of speech impairment. Two use headsticks and one uses a mouthstick to access the computer keyboard. Most of the trainees can type no more than ten words per minute. Two of the trainees have college degrees and the rest have at least completed some community college courses. Everyone is a high school graduate. All students are presently active cases with the State Department of Rehabilitation. Three are active with the local Regional Center. The age range is eighteen to forty. Four live independently with the help of attendants and the rest live with their parents.

## Funding Sources: Present and Future

As mentioned UCP received a PDF grant from the State Department of Developmental Services in the amount of $67,500 to start the vocational training portion of the CAP. The project also received $5,000 from the Pacific Bell Foundation, $3,000 from IBM and $1,500 from a small private foundation. This funding paid the salaries of staff and bought some adaptive equipment. It haas also paid for rehabilitation engineering consultation. An IBM computer was purchased with the IBM donation. All other computers were in-kind donations.

Future funding has been partially secured as of this writing. The funding will be used for Phase II of the Project which will begin in October, 1986. Phase II is the Practical Work Experience phase which is described in the following section. CAP has received $50,000 from a large private foundation and $2,500 from a small local foundation. It is anticipated that another $50,000 will be granted from both private and public sources. We anticipate the need for a $100,000 budget for Phase II to cover more of our expenses than were

paid for with the PDF grant. The project is looking for on-going funding in FY 87-88 from the State Department of Rehabilitation, Habilitation Services. A proposal has already been submitted and has been provisionally accepted.

## Things To Be Done Differently

More research of the market place should have been done before deciding on the training classes to be offered. The two courses of study were selected without thorough research, although they seem to be appropriate for the students' abilities. In the assessment of students' abilities to perform work tasks, the project should have had more BAC volunteers to set up "real work" tests of the students' skills. This has been started near the close of the project but should have been done on an on-going basis. Also we adjusted the teaching schedule of the CAD class to three days per week instead of five days per week in order to be able to afford to pay the architect for her teaching. The class should have had instructional time for the full five days and we plan to change this for our next teaching class.

Another limitation of the project was the need to track students into either bookkeeping or CAD training. If the students wanted training, they had to accept one of these two training options. Because the CAP was "the only game in town" for people with severe multiple disabilities, interested people had fewer options than they would like and that they deserve to have.

This is a problem that will not be solved in the near future because of the economic limitations of this program. We must keep small until we can prove that this is a viable training model.

## The Next Step

The vocational training Phase I of the project ended in August. The next step is Phase II: Practical Work Experience. United Cerebral Palsy has received private foundation grants to implement Phase II for FY 86-87 starting on October 1st.

It was originally anticipated that the students would be ready for competitive work after the completion of the 8 month training course. As the training progressed, it became more apparent that the students would need a second phase of training to develop more skills to have an opportunity to obtain work experience. It is increasingly difficult to find an entry level job. With paid work experience on their resumes, those who are capable of entering the competitive job market will be much more likely to find employment. Many of the students will probably stay with the project as employees because of the limitations of their physical disabilities; e.g., slower than average work speed, the inability to easily and clearly use their speech to communicate, and the need for attendant care during working hours. It has been decided that work contracts will be procured during Phase II for both the computer aided drafting and the book-keeping projects. If the projects can be successful in procuring enough paid work to pay at least minimum wage to most of the employees, the project will attempt to establish two small sub-contract businesses.

The project has funds to hire a Contract Procurement Specialist who will procure paid work for the employees. If the two businesses are established, we don't anticipate being totally for-profit and self-sustaining. Each small business will employ a job supervisor

and the bookkeeping business will need a vocational aide to manipulate papers for the employees and help with personal care. It is anticipated that the on-going salaries of the supervisory and support staff will be funded by public monies from the State Department of Rehabilitation, Habilitation Services. All income earned by the business will be paid to the disabled employees. There will be no second training class during FY 86-87. We will evaluate the feasibility of on-the-job training by accepting two more students into each practical work experience program. If on-the-job training is feasible we will no longer offer classroom training. We also would like to expand our client population to include persons with other moderate to severe physical disabilities. The project has set itself an ambitious goal. We feel we have the funding, the staff support, the engineering expertise and the skilled, capable employees which will make this venture a success.